CLAIMS

1. 1. A method for fabricating a magnetic head including a spin valve sensor, comprising the steps of:

fabricating a first electrical insulation layer (G1) above a first magnetic shield layer (S1);

fabricating a plurality of spin valve sensor layers above said G1 layer, said spin valve sensor layers including a seed layer, a PtMn antiferromagnetic layer, at least one pinned magnetic layer and at least one free magnetic layer;

wherein said seed layer is a three part seed layer comprised of Al_2O_3, NiMnO and NiFeCr.

2. A method for fabricating a magnetic head as described in claim 1 wherein said NiFeCr seed layer portion is fabricated to have a thickness of approximately 20 Å.

3. A method for fabricating a magnetic head as described in claim 1 wherein said spin valve sensor layers include at least one pinned magnetic layer having a composition including CoFe and at least one spacer layer having a composition including Cu, and at least one free magnetic layer having a composition including NiFe.

4. A method for fabricating a magnetic head as described in claim 1 wherein the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

5. A method for fabricating a magnetic head as described in claim 4 wherein the Cr concentration of said NiFeCr layer is approximately 38 at.%.

6. A method for fabricating a magnetic head as described in claim 5 wherein the composition of said NiFeCr layer is approximately $Ni_{49.5}$ $Fe_{12.5}$ Cr_{38}.

7. A method for fabricating a magnetic head including a spin valve sensor, comprising the steps of:

fabricating a first electrical insulation layer (G1) above a first magnetic shield layer (S1);

fabricating a plurality of spin valve sensor layers above said G1 layer, said spin valve sensor layers including a seed layer, a PtMn antiferromagnetic layer, at least one pinned magnetic layer and at least one free magnetic layer;

wherein said seed layer is comprised of Al_2O_3, NiMnO, NiFeCr layer portions, and wherein said NiFeCr layer is fabricated by depositing it to a first thickness and subsequently etching it back to a final thickness before the fabrication of said PtMn layer.

8. A method for fabricating a magnetic head as described in claim 7 wherein said NiFeCr layer is fabricated to have a final thickness of from approximately 10 Å to approximately 40 Å.

9. A method for fabricating a magnetic head as described in claim 8 wherein said NiFeCr seed layer is fabricated to have a final thickness of from approximately 15 Å to approximately 35 Å.

10. A method for fabricating a magnetic head as described in claim 9 wherein said NiFeCr layer is fabricated to have a final thickness of approximately 20 Å.

11. A method for fabricating a magnetic head as described in claim 7 wherein said first thickness of said NiFeCr layer is from approximately 15 Å to approximately 45 Å and it is etched back a thickness of from approximately 5 Å to approximately 15 Å.

12. A method for fabricating a magnetic head as described in claim 11 wherein said first thickness is approximately 30 Å and said final thickness is approximately 20 Å.

13. A method for fabricating a magnetic head as described in claim 7 wherein said spin valve sensor layers include at least one pinned magnetic layer having a composition including CoFe and at least one spacer layer having a composition including Cu, and at least one free magnetic layer having a composition including NiFe.

14. A method for fabricating a magnetic head as described in claim 7 wherein the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

15. A method for fabricating a magnetic head as described in claim 14 wherein the Cr concentration of said NiFeCr layer is approximately 38 at.%.

16. A method for fabricating a magnetic head as described in claim 15 wherein the composition of said NiFeCr layer is approximately $Ni_{49.5}\ Fe_{12.5}\ Cr_{38}$.

17. A method for fabricating a magnetic head as described in claim 7 wherein said first thickness is from 15 to 45 Å, and it is etched back a thickness of from 5 to 15 Å, and wherein the

Cr concentration of said NiFeCr layer composition is from approximately 35 at.% to approximately 46 at.%.

18. A magnetic head including a spin valve sensor comprising:

a magnetic shield layer (S1) being fabricated above a substrate base;

a first electrical insulation layer (G1) being fabricated above said S1 layer;

a spin valve sensor structure being disposed above said G1 layer;

wherein said spin valve sensor structure includes a seed layer being fabricated above said G1 layer, a PtMn layer being disposed above said seed layer and at least one pinned magnetic layer and at least one free magnetic layer being disposed above said PtMn layer; and

wherein said seed layer includes an Al_2O_3 layer, an NiMnO layer, and an NiFeCr layer.

19. A magnetic head as described in claim 18 wherein said NiFeCr layer is formed with a thickness of approximately 20 Å.

20. A magnetic head as described in claim 18 wherein the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

21. A magnetic head as described in claim 19 wherein the Cr concentration of said NiFeCr layer is approximately 38 at.%.

22. A magnetic head as described in claim 21 wherein the composition of said NiFeCr layer is approximately $Ni_{49.5}\ Fe_{12.5}\ Cr_{38}$.

23. A magnetic head including a spin valve sensor comprising:

a magnetic shield layer (S1) being fabricated above a substrate base;

a first electrical insulation layer (G1) being fabricated above said S1 layer;

a spin valve sensor structure being disposed above said G1 layer;

wherein said spin valve sensor structure includes a seed layer being fabricated above said G1 layer, a PtMn layer being disposed above said seed layer and at least one pinned magnetic layer and at least one free magnetic layer being disposed above said PtMn layer; and

wherein said seed layer has an upper surface comprised of NiFeCr having an etched crystalline structure.

24. A magnetic head as described in claim 23 wherein said NiFeCr layer is formed with a thickness of from approximately 10 Å to approximately 40 Å.

25. A magnetic head as described in claim 23 wherein said NiFeCr seed layer is formed with a thickness of from approximately 15 Å to approximately 35 Å.

26. magnetic head as described in claim 23 wherein said NiFeCr layer is formed with a thickness of approximately 20 Å.

27. A magnetic head as described in claim 23 wherein the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

28. A magnetic head as described in claim 27 wherein the Cr concentration of said NiFeCr layer is approximately 38 at.%.

29. A magnetic head as described in claim 28 wherein the composition of said NiFeCr layer is approximately $Ni_{49.5}$ $Fe_{12.5}$ Cr_{38}.

30. A magnetic head as described in claim 23 wherein said spin valve sensor structure includes at least one PtNm antiferromagnetic layer, at least one pinned magnetic layer having a composition which includes CoFe, at least one spacer layer having a composition which includes Cu, and at least one free magnetic layer having a composition which includes NiFe.

31. A hard disk drive, including at least one magnetic head having a read head portion comprising:

a magnetic shield layer (S1) being fabricated above a substrate base;

a first electrical insulation layer (G1) being fabricated above said S1 layer;

a spin valve sensor structure being disposed above said G1 layer;

wherein said spin valve sensor structure includes a seed layer being fabricated above said G1 layer, a PtMn layer being fabricated above said seed layer and at least one pinned magnetic layer and at least one free magnetic layer; and

wherein said seed layer includes an Al_2O_3 layer, an NiMnO layer and an NiFeCr layer.

32. A hard disk drive as described in claim 31 wherein said NiFeCr layer has a thickness of approximately 20 Å.

33. A hard disk drive as described in claim 31 wherein the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

34. A hard disk drive as described in claim 33 wherein the Cr concentration of said NiFeCr layer is approximately 38 at.%.

35. A hard disk drive as described in claim 34 wherein the composition of said NiFeCr layer is approximately $Ni_{49.5}$ $Fe_{12.5}$ Cr_{38}.

36. A hard disk drive, including at least one magnetic head having a read head portion comprising:

a magnetic shield layer (S1) being fabricated above a substrate base;

a first electrical insulation layer (G1) being fabricated above said S1 layer;

a spin valve sensor structure being disposed above said G1 layer;

wherein said spin valve sensor structure includes a seed layer being fabricated above said G1 layer, a PtMn layer being fabricated above said seed layer and at least one pinned magnetic layer and at least one free magnetic layer; and

wherein said seed layer has an upper surface comprised of NiFeCr having an etched crystalline structure.

37. A hard disk drive as described in claim 36 wherein NiFeCr seed layer is formed with a thickness of from approximately 10 Å to approximately 40 Å.

38. A hard disk drive as described in claim 36 wherein said NiFeCr seed layer is formed with a thickness of from approximately 15 Å to approximately 35 Å.

39. A hard disk drive as described in claim 36 wherein said NiFeCr layer is formed with a thickness of approximately 20 Å.

40. A hard disk drive as described in claim 36 wherein the Cr concentration of said NiFeCr layer is from approximately 35 at.% to approximately 46 at.%.

41. A hard disk drive as described in claim 40 wherein the Cr concentration of said NiFeCr layer is approximately 38 at.%.

42. A hard disk drive as described in claim 41 wherein the composition of said NiFeCr layer is approximately $Ni_{49.5}$ $Fe_{12.5}$ Cr_{38}.

43. A hard disk drive as described in claim 36 wherein said spin valve sensor structure includes at least one PtNm antiferromagnetic layer, at least one pinned magnetic layer having a composition which includes CoFe, at least one spacer layer having a composition which includes Cu, and at least free magnetic layer having a composition which includes NiFe.